

The Accession Medical Standards Analysis & Research Activity (AMSARA)

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Agenda

- Background
- Medical Accession Process
- Review of Attrition
- Past Studies (including back-up slides)
- Current Studies
 - Assessment of Recruit Motivation and Strength (ARMS)
 - Psychiatric Screening of Military Applicants

Background & Justification

- 1997 Government Accounting Office Report on Military Attrition
- Accession Medical Standards Steering Committee Accession Medical Standards Working Group Charter
- Joint Vision 2010 Document
(Chairman of the Joint Chiefs of Staff)

Purpose of AMSARA

- Established in 1996 in the Division of Preventive Medicine, Walter Reed Army Institute of Research (WRAIR)
- Supports the DoD Accession Medical Standards Working Group (AMSWG) and the USD Personnel and Readiness MEDPERS Committee

The Mission of AMSARA

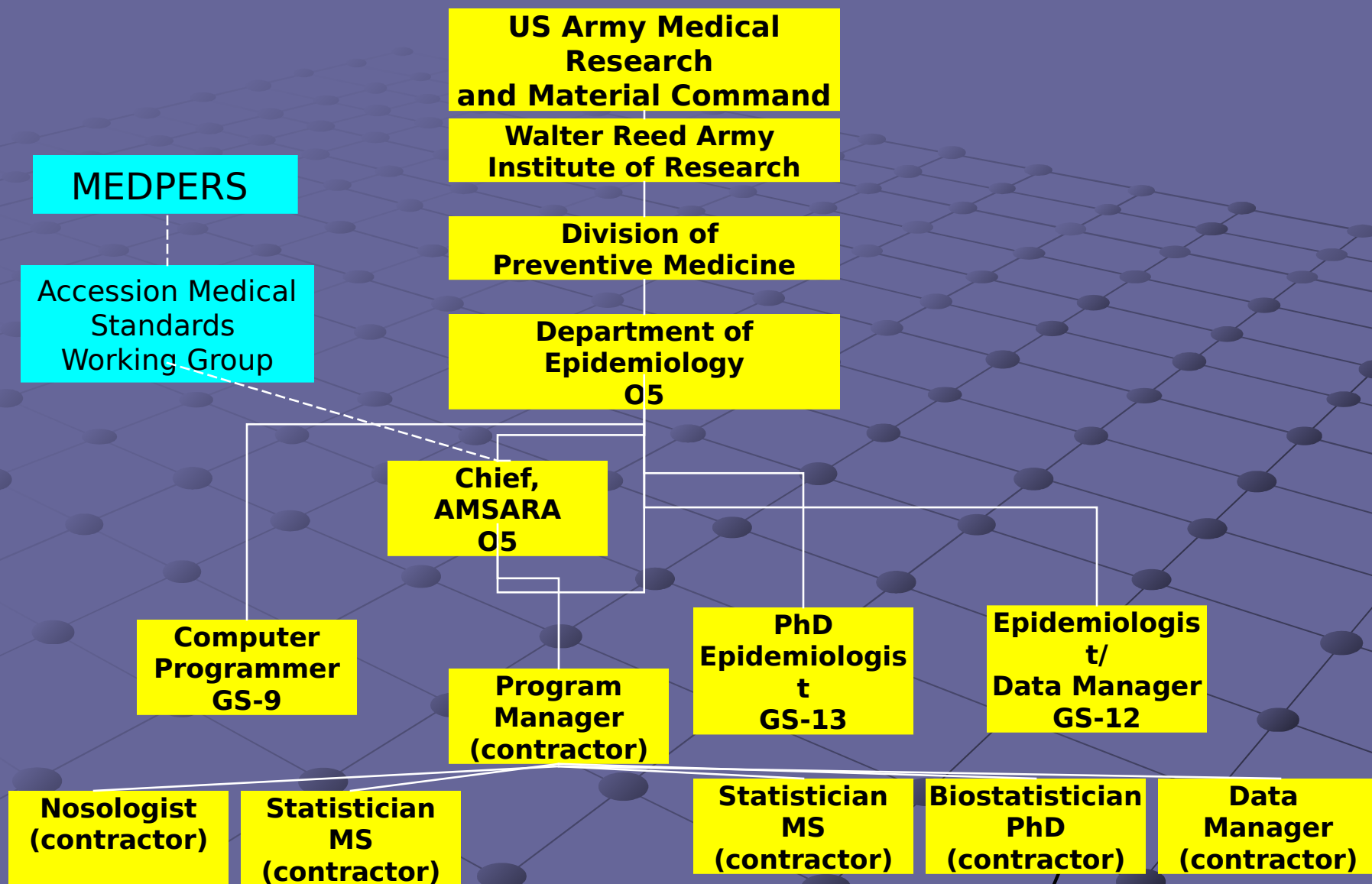
Support the development of evidence-based accession standards:

1. Guide the improvement of medical and administrative databases
2. Conduct epidemiologic analyses
3. Integrate into policy recommendations relevant operational, clinical, and economic considerations

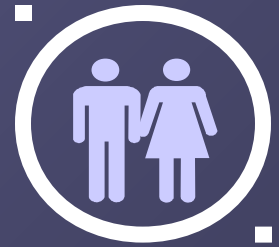
AMSARA Objectives:

- Validate current and proposed standards
- Validate assessment techniques
- Medical and administrative quality assurance
- Optimize assessment techniques
- Track impact of policies, procedures, and waivers
- Recommend changes to enhance readiness, protect health, and save money

Personnel



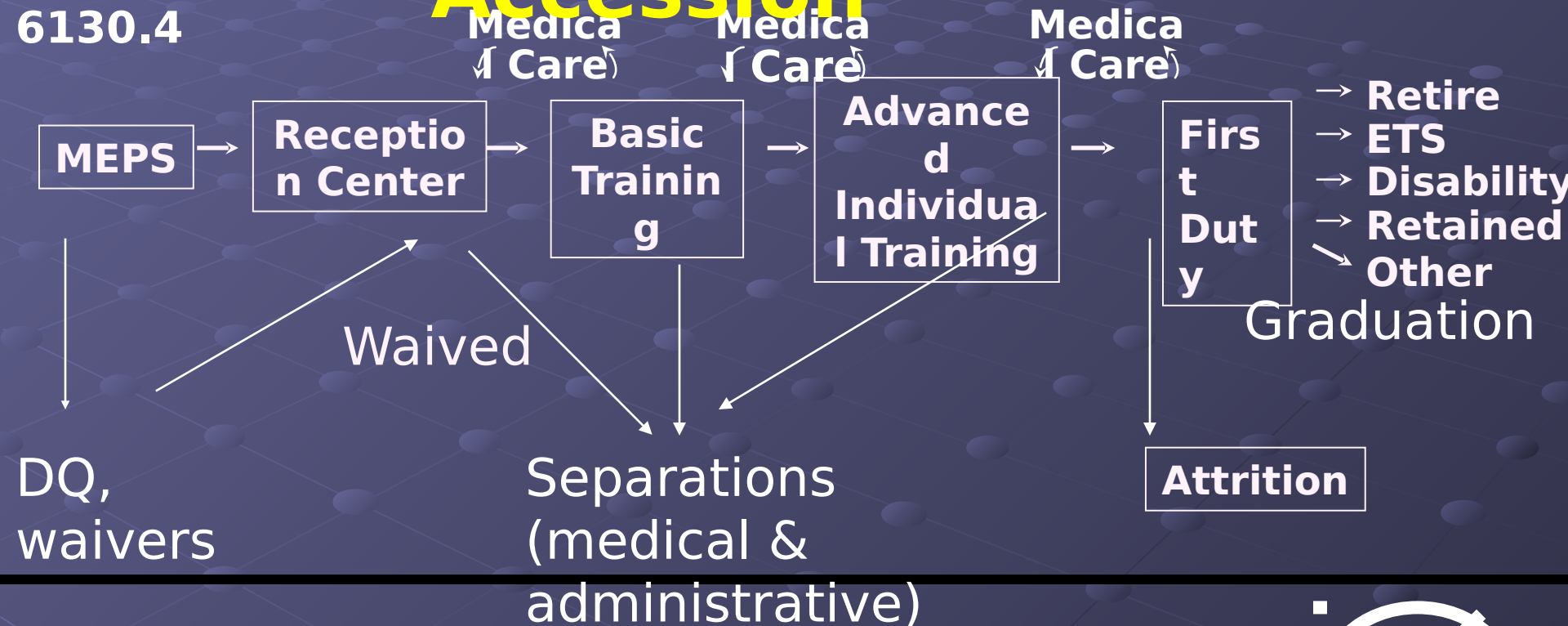
Using Epidemiologic Data Analysis To:



Maximize Successful

Accession

DoD Instruction
6130.4



And Minimize Attrition



Enlisted Accession



**MEDPERS Committee
AMSWG**

Accession Standards

**Primary
Applicant
Pool**

**Recruiter
Qualification**

MEPS

**Waive
r**

**Delayed
Entry
Program**

MEPS

**18-24 year olds
14M men
14M women**

**Rejection
?%**

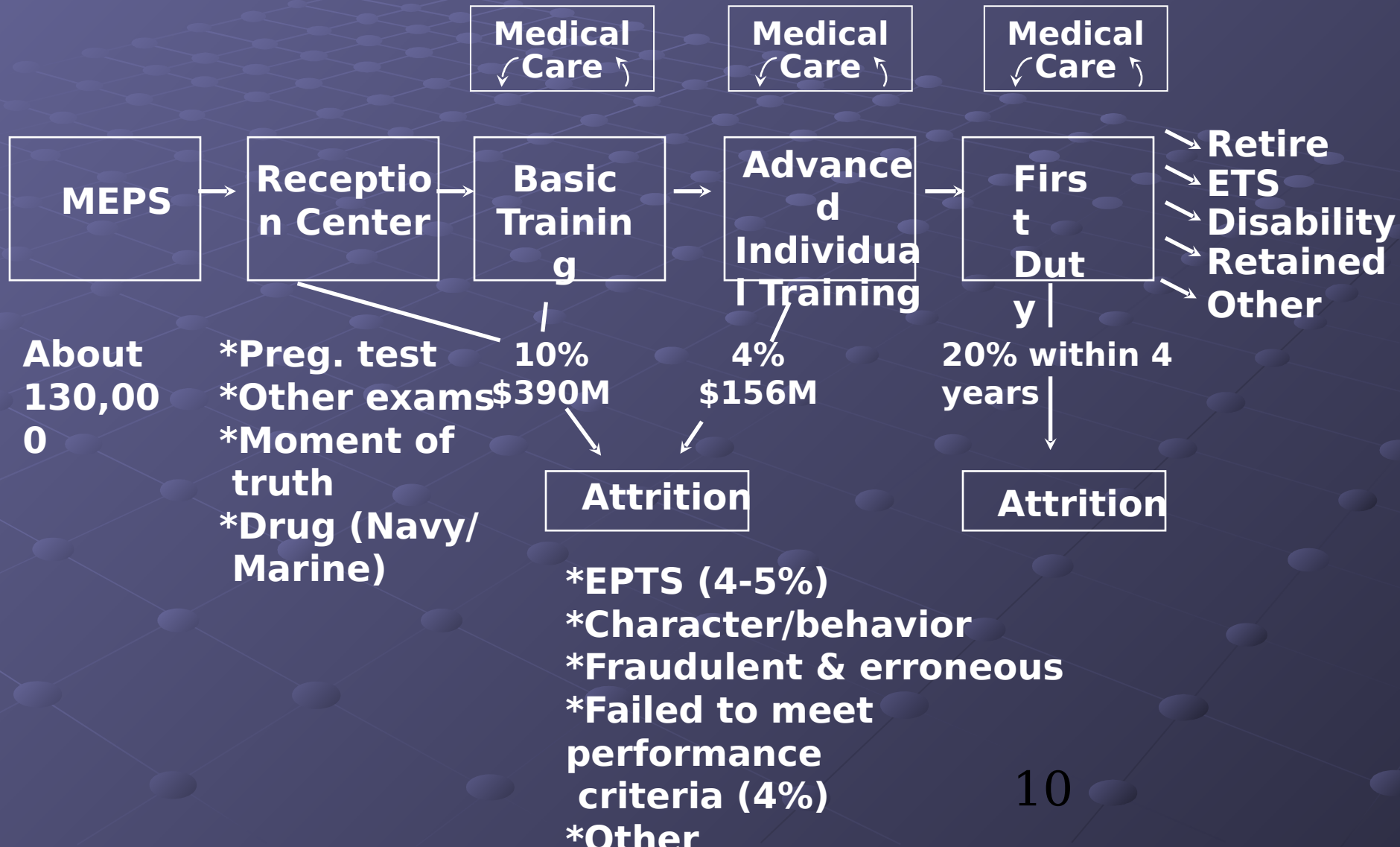
***ASVAB
*Medical exam
*Background
*Drug
(Army/AF)**

**Rejection
?%**

Losses

***Final
process
*Brief
exam**

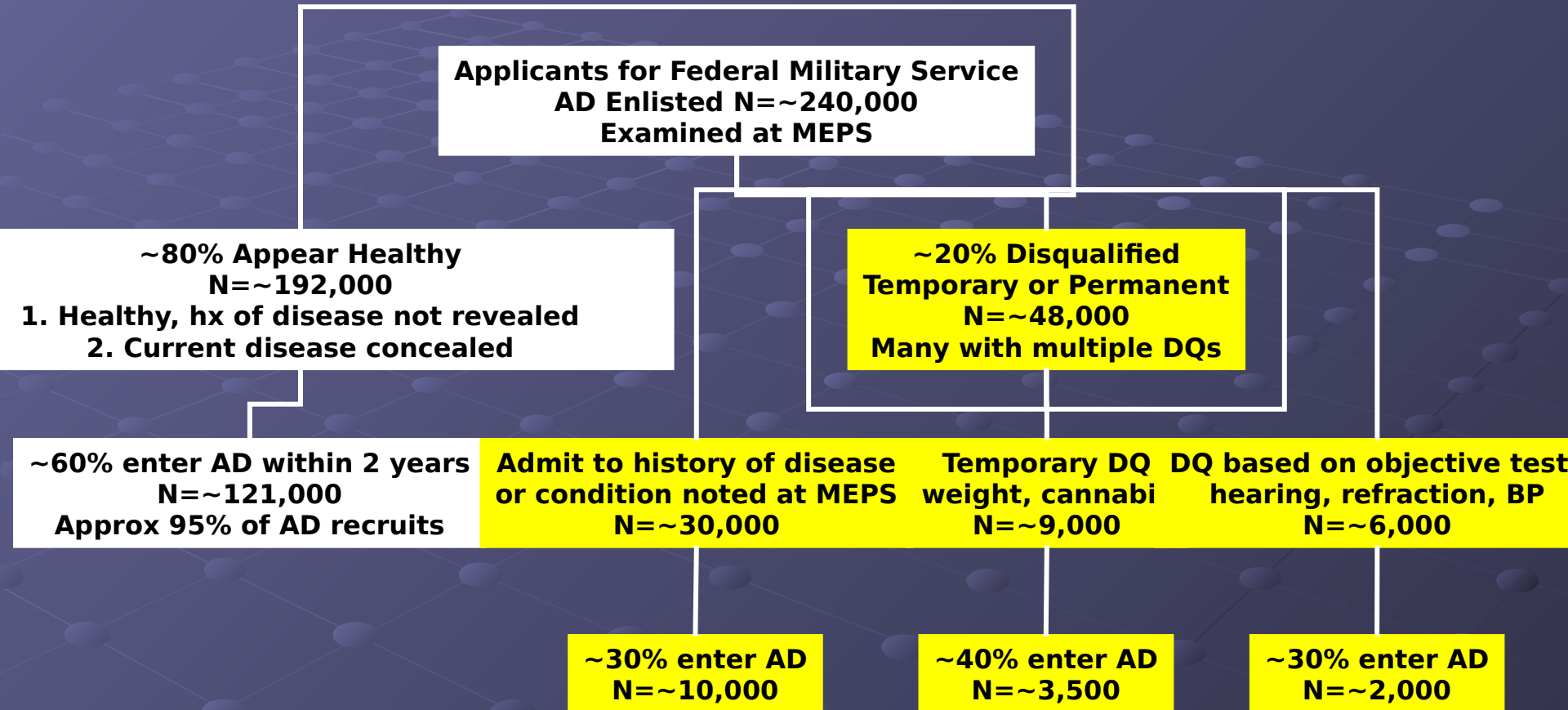
Enlisted Attrition



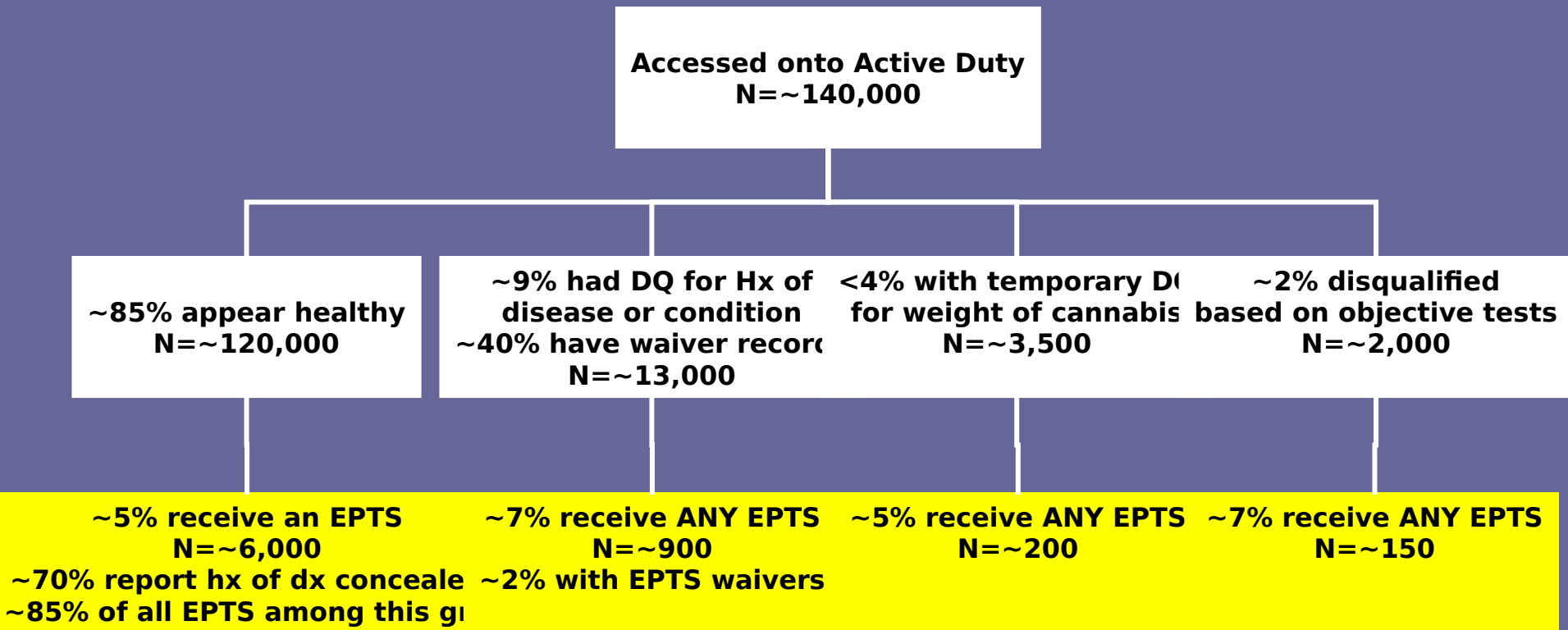
AMSARA Makes Sense: Salient points

- Over 240,000 accession medical exams per year and approximately 140,000 accessions per year
- Recruiting, screening, and training costs run approximately \$35,000 per enlistee (FY03)
- About 14% (>18,000/yr) of recruits fail to finish IET
- About 5% leave with EPTS conditions
- About 33% of enlistees fail to finish first tour

Active Duty Applicants & Accession By Qualification: Yearly Average 1997-2002



Expected Annual Attrition Among Active Duty Accessions by Qualification Status based on CY 1997-2002



Current Screening Process Challenges

● Disqualifies many who can serve successfully

- Amongst AD accessions < 5% have a waiver
- Waiver studies show few of those waived receive an EPTS discharge for the waived condition

● Fails to identify many with disqualifying conditions

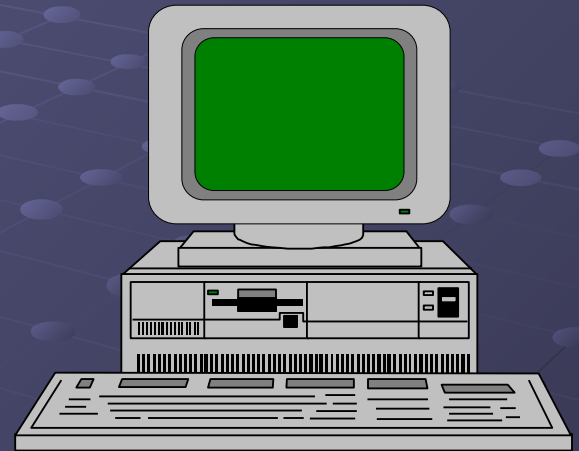
- Approximately 5% of all accessions are EPTS discharged
- EPTS studies show few were disqualified and waived for that condition

Types of Studies Conducted

- Descriptive, Case Series, Case-control
 - Characterize applicants, accessions, hospitalizations, EPTS, disability discharges
- Waived for pre-existing conditions
 - Asthma, ADHD, Back, Knee, Skin, Mental Health
- Program assessment
 - Chlamydia screening, Injury rehab, Coping skills
- Retrospective study of discharges
 - Asthma, Psychiatric, Fort Jackson EPTS
- General attrition modeling
 - To include Survival analysis, multivariate analysis, Logistic Modeling, Multiple Event Modeling
- Prospective efficacy trials challenging accession standards and screening

AMSARA's Data Sources

- USMEPCOM
- DODMERB
- Service Academies
- Waiver Authorities
- Ambulatory Data System
- Hospitalizations
- Existing Prior to Service Discharges
- Disability Agencies
- Defense Manpower Data Center (Personnel Data)



Collaborative Studies In Progress

- **US MEPCOM & USA Accession Command**
 - **Assessment of Recruit Motivation and Strength (ARMS)**
 - **Funded by USAAC, MEPCOM & ARNG**
- **Division of Neuropsychiatry (WRAIR)**
 - **Small Business Initiative Research Phase II to develop a psychiatric screen at MEPS**
 - **OSD sponsored**

ARMS:

Physical Performance Testing

- **Step- test (modified Harvard step test)**
 - Step is 16" men and 12" women
 - Perform step-test for 5 minutes, 30 steps per minute
 - Heart rate 1 minute post-exercise
 - All difficulties performing the test will be noted
 - Motivation is a factor in performing this test
 - Difficult to perform for those with lower extremity problems
- **Push-ups**
 - Number done in one minute
 - 15 for men and 4 for women
- **Incremental Dynamic Lift (Military Press)**
 - Maximal weight lifted, 50 lbs men and 40 lbs women
 - Utilized by the Air Force

Methodology

Cohort study conducted at 6 MEPS

- San Diego, Chicago, Sacramento, San Antonio, Buffalo & Atlanta
- Three phase study
- WRAIR Institutional Review Board Approved

Phase I & II

- Completed Feb 2005
- Funding: US Army Accession Command (\$450K) & MEPCOM (\$300K)
- Physical performance testing required but not will not impact qualification status
- Determine ability of ARMS test to predict future attrition and morbidity in general recruit population

Phase III

- Automatic waiver for over body fat applicants who pass ARMS
- Up to a maximum body fat of 30% for males and 36% for females
- Funding: US Army Accession Command (\$300K) & ARNG (\$400K)
- Enrollment from Feb 05 thru Dec 2006 with one year follow-up for morbidity and attrition

Phase IV

- Pending DA UFR funding
- Automatic waiver for selected (to be determined) musculoskeletal conditions who pass ARMS in CY 2006

Study Size & Expected Outcomes

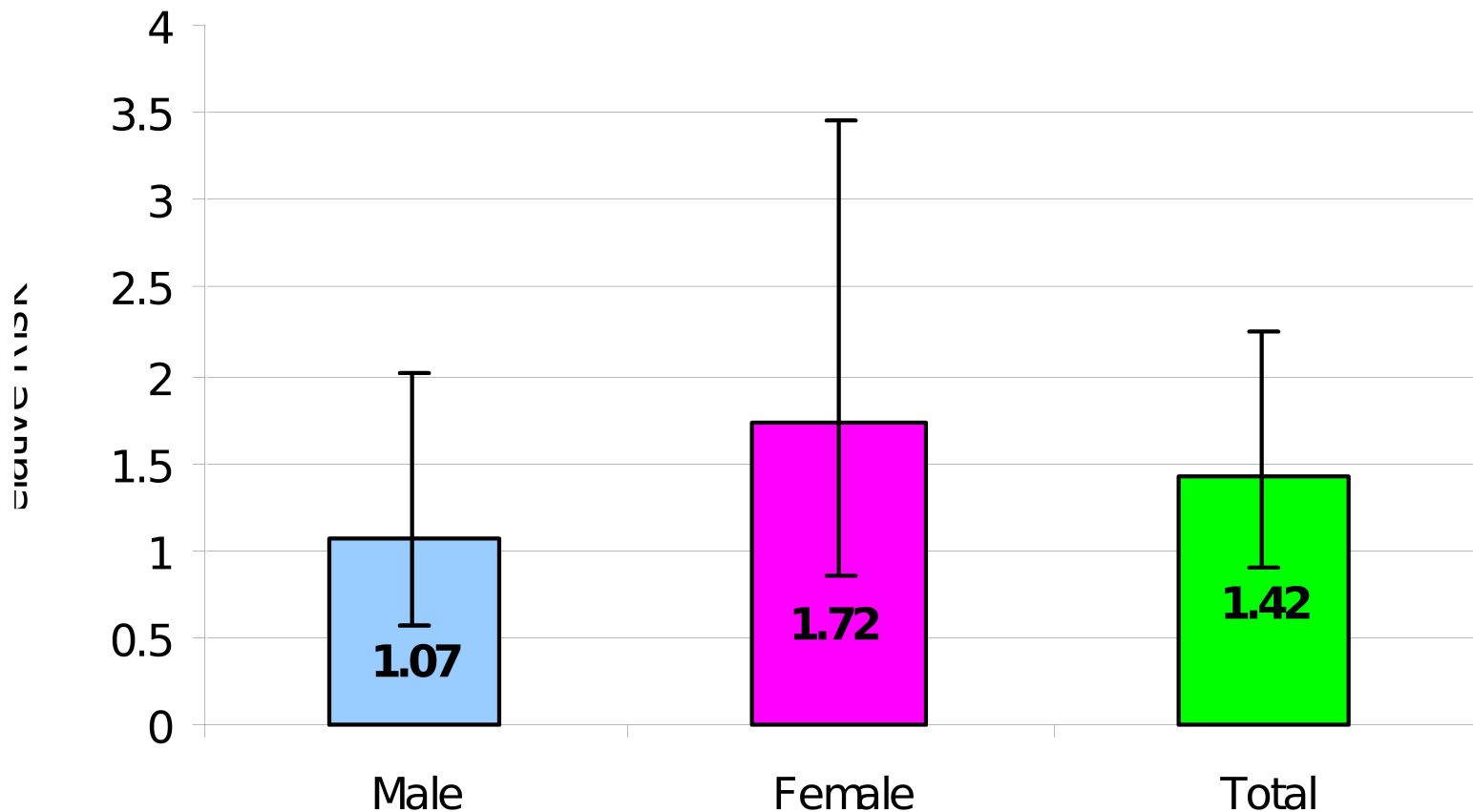
- Need ~4,000 phase III who meet Wt or BF applicants and ~1,100 phase III over body fat
 - Assuming 75% to pass the ARMS test
 - Assuming ~70% to ship to BCT
 - Assuming ~90% to remain on active duty for at least 60 days
 - 87% probability (power) of detecting at least 50% fewer discharges in the ARMS qualified group as compared to those who failed it
 - 95% probability of detecting a 30% difference in attrition between those over body fat and those within standards

ARMS Phase III 60-Day Attrition Results* as of 12 July 2005

	Female		Male	
	Over Body Fat (n=54)	Wt/BF Qualified (n=228)	Over Body Fat (n=138)	Wt/BF Qualified (n=1246)
Total Attrited	10	22	10	82
% subjects	18.5	9.6	7.2	6.6

* No statistically significant difference observed between fully qualified and over body fat recruits for males or females

Relative Risk of 60 Day Attrition in ARMS Waived Over Body Fat versus Met Body Fat Standard



Discussion

- Early results show no significant increased risk of attrition in those who are over body fat and pass the ARMS test compared to those within weight or BF standard
- Insufficient study population and incomplete longitudinal review of attrition precludes formulation of definitive conclusions and recommendations

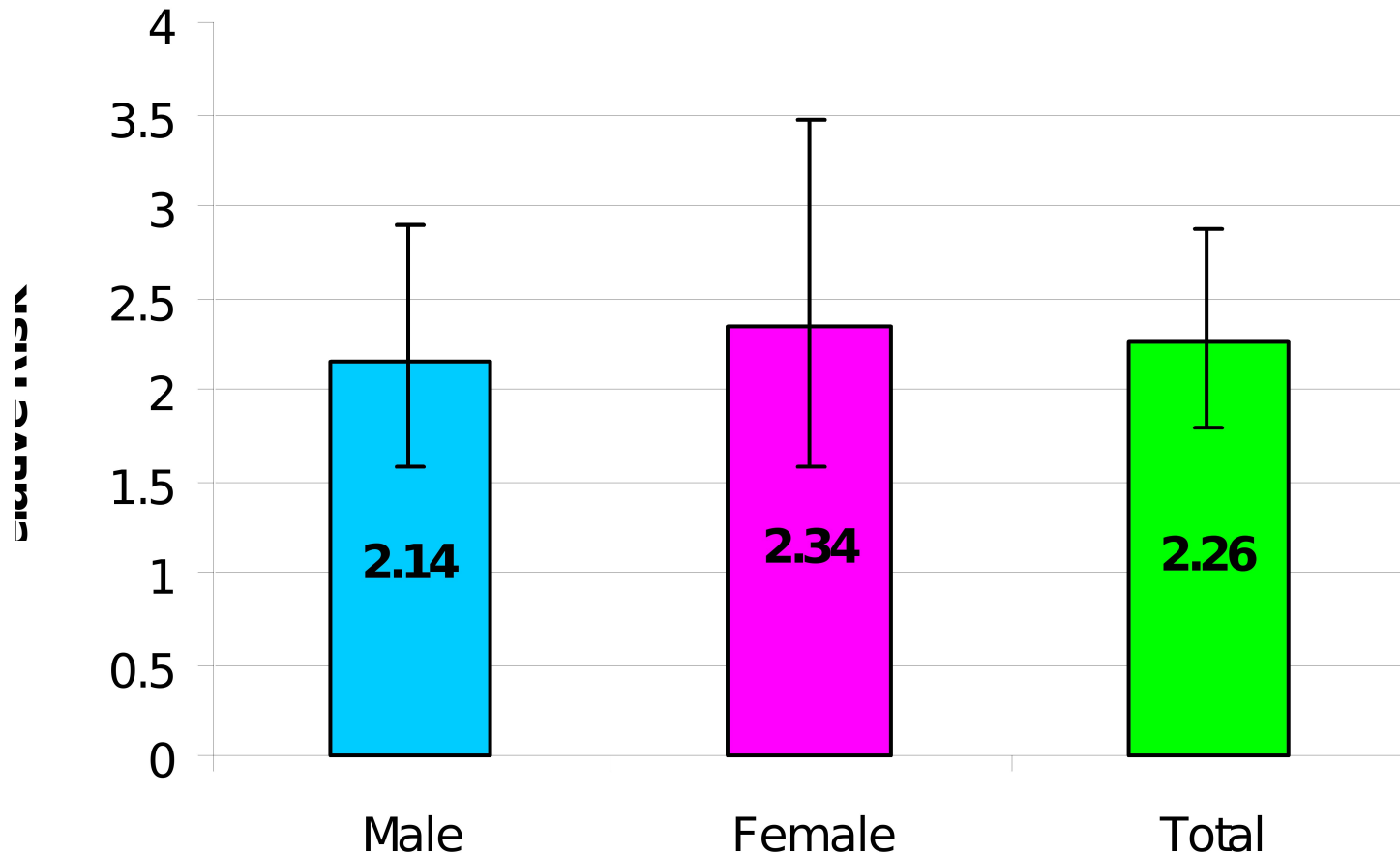
Frequency and percentage of **first injury** of ARMS Phase III
Male accessions treated at a fixed medical treatment
facility thru Aug 05

Injury Type	Wt/BF Qualified N=4041 Count (%)	Over Body Fat N=165 Count (%)	P value
Sprains	243 (6)	11 (7)	
Fractures (non-stress)	21 (0.5)	1 (0.6)	
Stress Fracture	22 (0.5)	1 (0.6)	
Pain in Joint	258 (6)	18 (11)	
Heat Injury	10 (0.2)	5 (3)	
Contusions	41 (1)	3 (2)	
Other Injury	595 (15)	26 (16)	
Any Injury	1069 (27)	65 (39)	<0.001

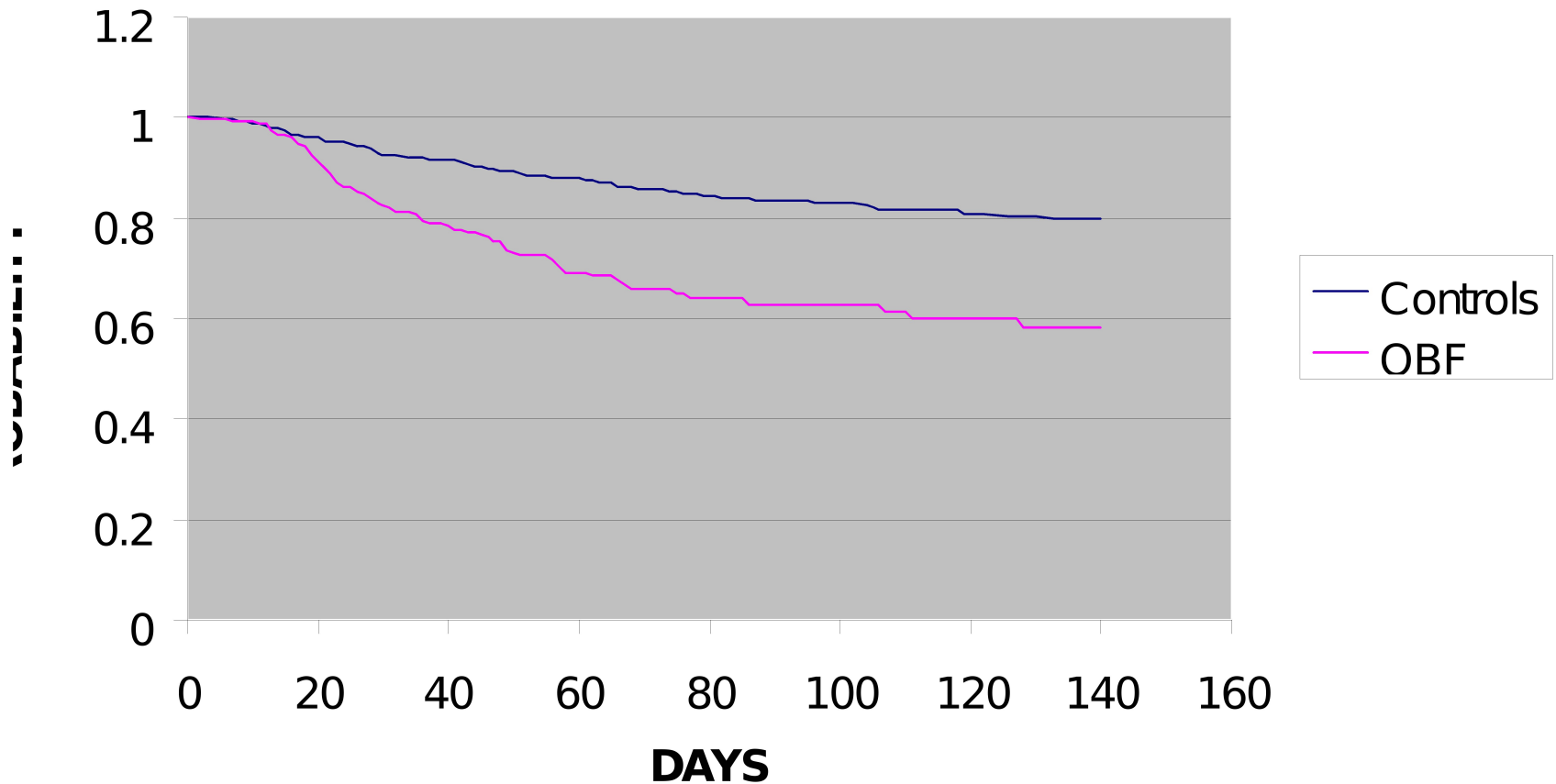
Frequency and percentage of **first injury of** ARMS Phase III
Female accessions treated at a fixed medical treatment
 facility thru Aug 05

Injury Type	Wt/BF Qualified N=946 Count (%)	Over Body Fat N=70 Count (%)	P value
Sprains	68 (7)	5 (7)	
Fractures (non-stress)	6 (1)	0 (0)	
Stress Fracture	9 (1)	0 (0)	
Pain in Joint	83 (9)	11 (16)	
Heat Injury	5 (1)	0 (0)	
Contusions	7 (1)	6 (9)	
Other Injury	118 (12)	14 (20)	
Any Injury	296 (31)	36 (51)	<0.001

Relative Risk of 60 Day First Injury All Cause in ARMS Waived Over Body Fat versus Met Body Fat Standard thru Aug 05

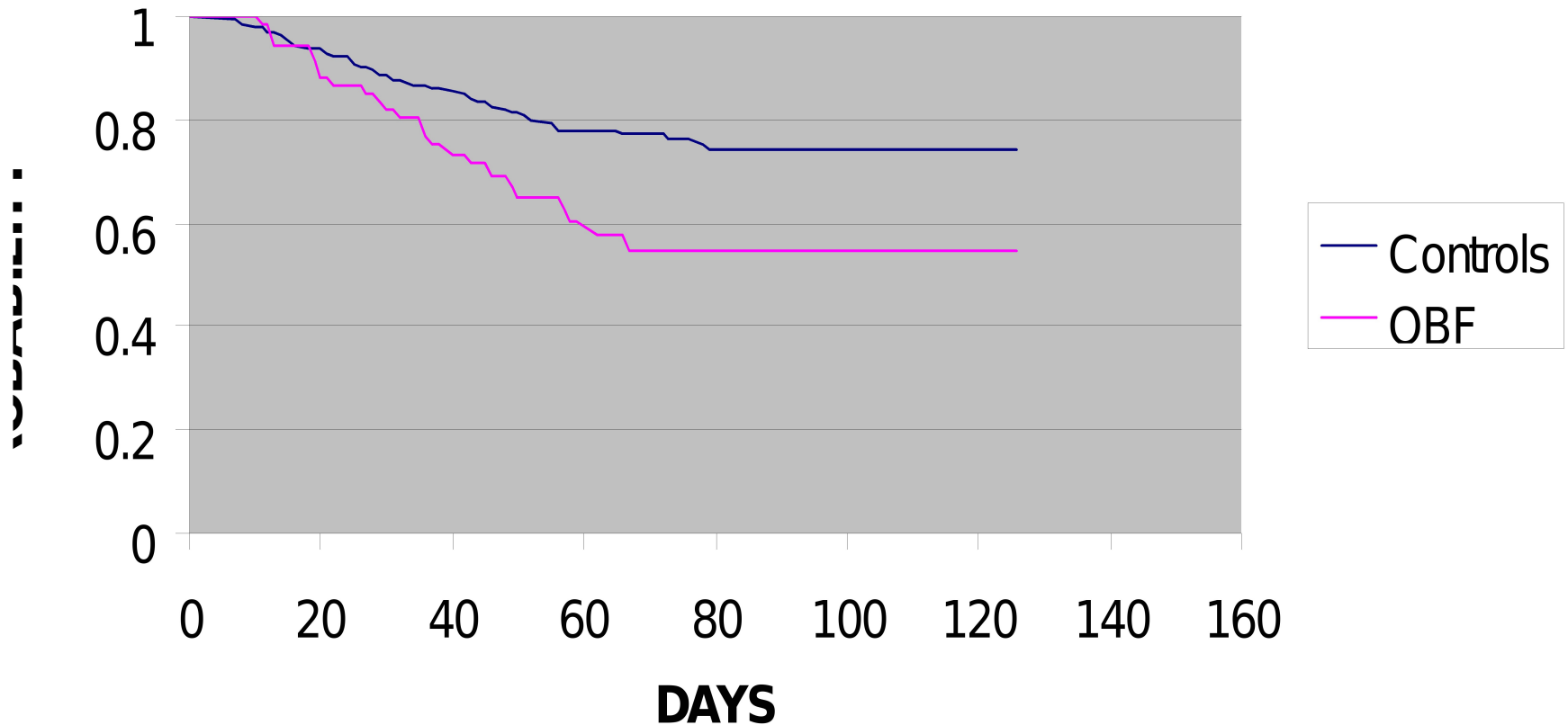


ESTIMATED PROBABILITY OF REMAINING INJURY-FREE DURING FIRST 160 DAYS OF SERVICE: MALES, OVER BODY FAT (OBF) VERSUS CONTROLS



All tests: Log Rank, Wilcoxon, Likelihood ratio $p < 0.05$

ESTIMATED PROBABILITY OF REMAINING INJURY-FREE DURING THE FIRST 160 DAYS OF SERVICE: FEMALES, OVER BODY FAT (OBF) VERSUS CONTROLS



All tests: Log Rank, Wilcoxon, Likelihood ratio
 $p < 0.05$

Injury Data Analysis

- Increased overall risk of all cause injury for both males and females who exceed body fat standards compared to fully qualified
- Leading injury categories are minor and include sprains and pain in joints
- Heat injuries and fractures are uncommon in both fully qualified and over body fat
- Current small numbers preclude definitive comparisons for individual injury categories
- Recommend ongoing testing and data collection

Potential Benefits of Adding a Performance Test

- Emphasis on physical fitness prior to entry
- Recruiters provide information to applicants on how to train
 - **Increase potential recruiting pool by at least 33 million**
 - **> 11,000 more annual accessions to BCT**
- A measure of applicant motivation
- Losses will be moved “far to the left” based on measurable criteria likely to be related to future attrition
- Decreased injuries during BCT with higher level of physical fitness prior to entry

Psychiatric Disorders: Burden of Disease

❑ **Medical failures (permanent disqualifications):**

- 4.6% of all medical failures with over 2,300 per year from 1995 to 2000

❑ **Medical Waivers:**

- 5.5% of all AD waivers from 1995 to 2000
- Top 5 Causes: attention deficit, depression, suicide, drug abuse, enuresis

■ **EPTS discharges:**

- 27.2% of all AD EPTS discharges from 1996 to 2001 with over 2,200 per year
- Top 5 Causes: Depression, Behavior, Personality, Suicide, attention deficit

Research Objectives

- ❑ To develop a rapid, inexpensive method to screen military recruits for major psychiatric disorders or other behavioral factors that strongly predict occupational dysfunction in the military
- ❑ Results should be standardized and interpretable by physicians without specialty training in psychiatry
- ❑ The screening test should be reliable, and valid without significant health risk to persons tested

Small Business Initiative Research (SBIR)

- ❑ OSD has awarded two contracts to develop a psychiatric screen for use at the MEPS
- ❑ **Phase I (completed in 2002)**
 - Lasted for 6 months at a cost of \$100,000 per contract
 - Resulted in the development of two questionnaire prototypes
 - Focused on depression, anxiety, psychiatric medication, alcohol, personality, adverse childhood events, psychoticism, function, motivation, self-esteem, social desirability, and executive function

SBIR: Phase II

- ❑ Two year (2003 to 2005) contract awarded to both contractors for \$750,000 each
 - Both contractors have conditional Human Subjects Research Review Board approval
 - **Pending US MEPCOM approval to begin validation studies in selected MEPS (a total of 8 sites)**
 - **Informed consent will be obtained by research assistant**
 - **A cash incentive for participation will be offered**
 - The two electronic questionnaires are 187 and 317 items and are designed to be completed in 40 and 90 minutes respectively
 - Projected study sample size is over 5,000 participants for each contract

SBIR: Phase II

- ❑ Questionnaires include items to detect malingering and “faking good”
- ❑ Study participants will be followed for at least 6 months on active duty for psychiatric disorders as well medical and administrative discharges
- ❑ Objective is to develop a predictive model for psychiatric disorders in military applicants
- ❑ Goal is to reduce attrition in Initial Entry Training attrition due to psychiatric disorders by at least 10%



Questions?

Early AMSARA Projects

- **Eliminating syphilis screening** at MEPS could save \$2.5 million per year that can be reallocated
- Individuals waived for **orthopedic knee conditions** in the Army experience more rapid premature discharges (significant for females)*
- Females experienced 15% more **hospitalizations** (excluding childbirth and its complications) in the first year in the service
- The **first phase of attrition modeling** among enlisted personnel demonstrated that being female, white, having dependents, being medically disqualified at MEPS and being married are all independent risk factors for attrition

2000 Completed Studies

- Five year survival study of those entering active duty having received a waiver for a prior diagnosis of **ADHD** remain on active duty as long as the general recruit population
- Five year survival study of those entering active duty having received a waiver for a prior diagnosis of **asthma** were more likely to remain on active duty than the general recruit population
- Five year survival study of those waived for **mental health disorders** are at increased risk for both psychiatric hospitalization and attrition than the general recruit population

2001 Completed Studies

- EPTS case series reviews in support of the AMSWG review of DoDI 6130:
 - **hernia, hepatitis, TMD, thyroid, diabetes mellitus, abnormal pap smears, varicocele, & enuresis**
- Early hospitalization for injury and subsequent attrition
- Interim reports on the retention of Mild Asthmatics in the Navy (REMAIN) & Asthma EPTS studies
- 6 month of Military Service **Psychiatric Hospitalization and Subsequent Risk of Attrition**

2002 Completed Studies

- EPTS case series reviews in support of the AMSWG review of DoDI 6130:
 - hearing loss
 - scoliosis
 - low back pain
- Survival analysis of recruits with a waiver for **pes planus showed increase risk of attrition while scoliosis, headache, and hypertension showed no difference in attrition**
- Interim report on the Review of Initial Entry Training Discharges at FT Leonard Wood

2003 Completed Studies

- EPTS case series reviews in support of the AMSWG review of DoDI 6130:
 - **depression, pes planus, hypertension, headache, & retropatellar pain syndrome**
- Completed data collection in the use of exhaled nitric oxide as a predictor of asthma in MEPS applicants (n=2800+)
- Completed data collection in the asthma EPTS study at FT Jackson & FT Knox (n=4000+)
- Completed data collection in the Review of Initial Entry Training Discharges at FT Leonard Wood (n=2900+)

2004 Completed Studies

- Myopia waiver survival analysis showed no difference in attrition
- EPTS case series review of myopia in support of the AMSWG review of DoDI 6130.4
- Completed a BUMED waiver application review of approved and denied cases of asthma, ADHD and hearing loss
- Completed analysis of the Review of Initial Entry Training Discharges at FT Leonard Wood (n=2900+)
- Studied the trend in military applicants from 2000 to 2004
- Studied the trend in military hospitalizations from 1999 to 2003

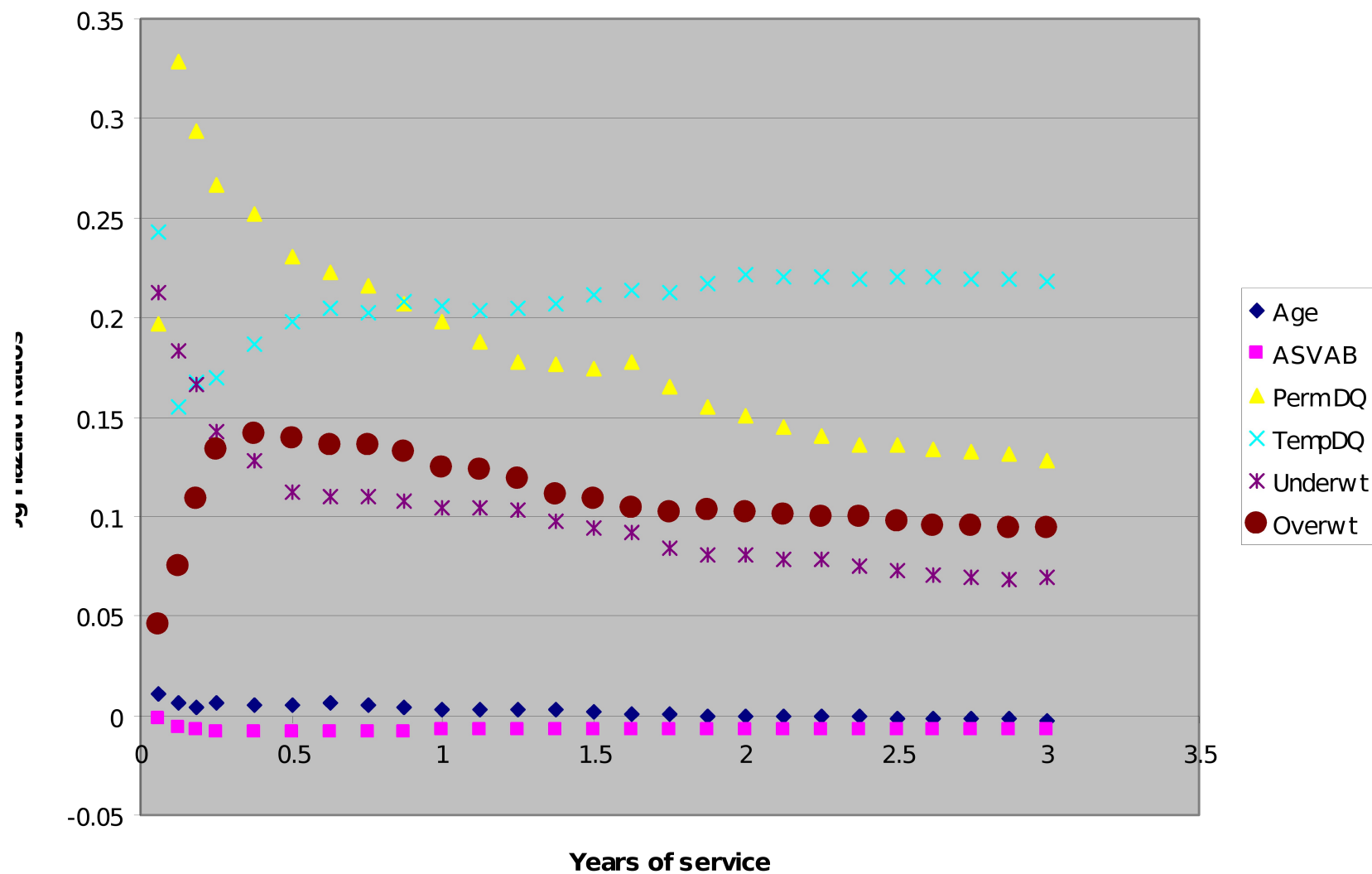
***Early Attrition Among Military
Enlistees:
Finding Significant Prediction
Factors (1999 AMSARA Annual
Report)***

- Identification and quantification of risk factors for early enlisted attrition
- Risk factors selected from information known to services at time of application
- Service-specific analyses
- Each factor adjusted for effects of the others

Extension of attrition modeling to consider changing effects of attrition predictors over service time (2003 AMSARA Annual Report)

- Effects of attrition predictors found to vary over service time
- Time-dependent model introduced to develop more accurate picture
- Factors found to affect only earliest attrition may be handled differently from those with long-term effect

Fig 1: The Log of the Cumulative Hazard Ratios in The Army



AMSARA Detailed Examinations of Medical Waiver Approvals

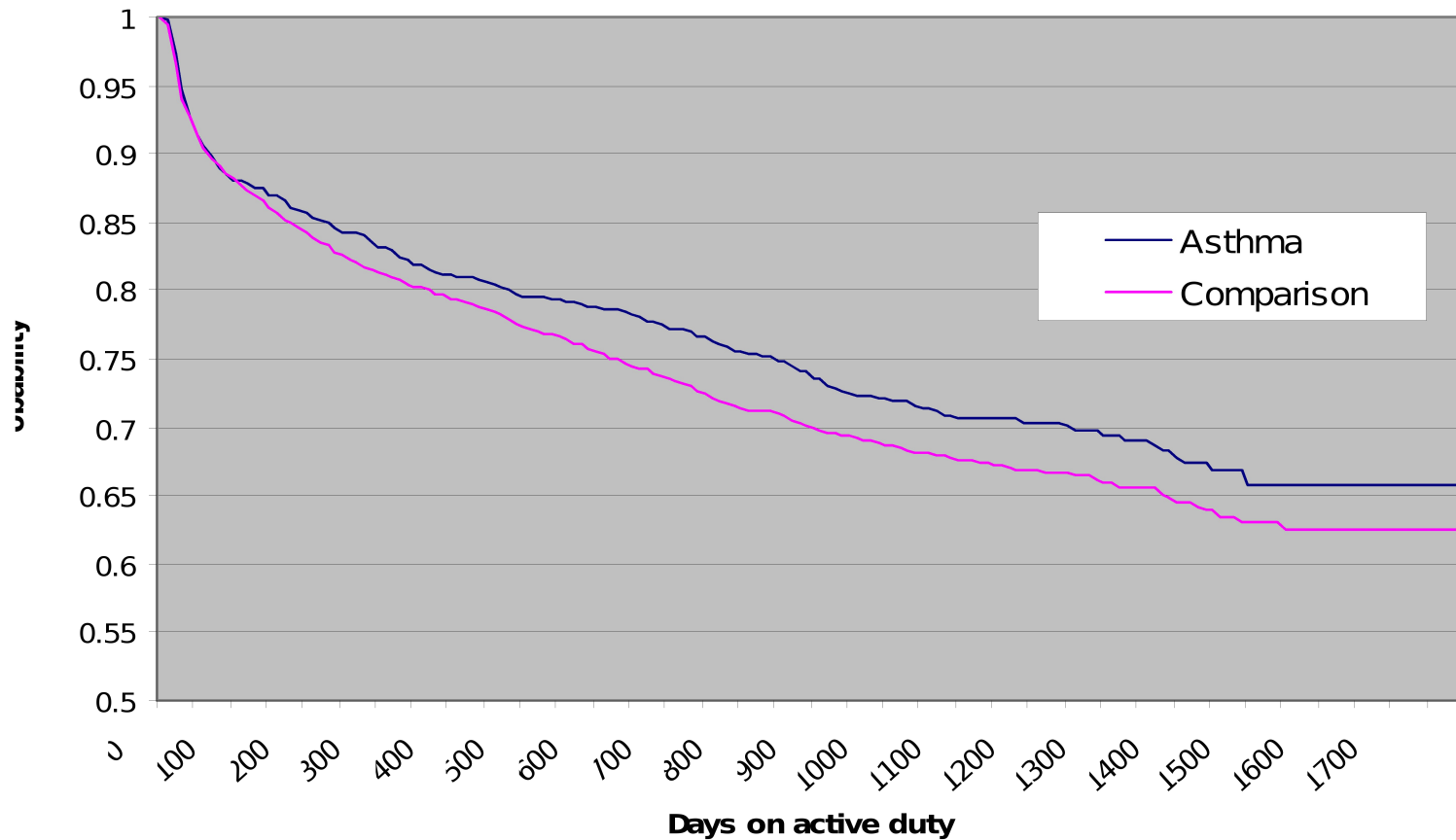
- All waiver approval records for a given condition (e.g. asthma) selected
- Those with secondary conditions excluded
- Only approved waivers with an accession (gain) record included
- Matched comparison subjects with no waiver needed selected (matched on age, sex, race, service, time of beginning duty, etc.)
- Subject groups tracked and compared for overall attrition, medical attrition, hospitalization, clinic visits, disability, other

Waiver Survival Studies of Various Medically Disqualifying Conditions

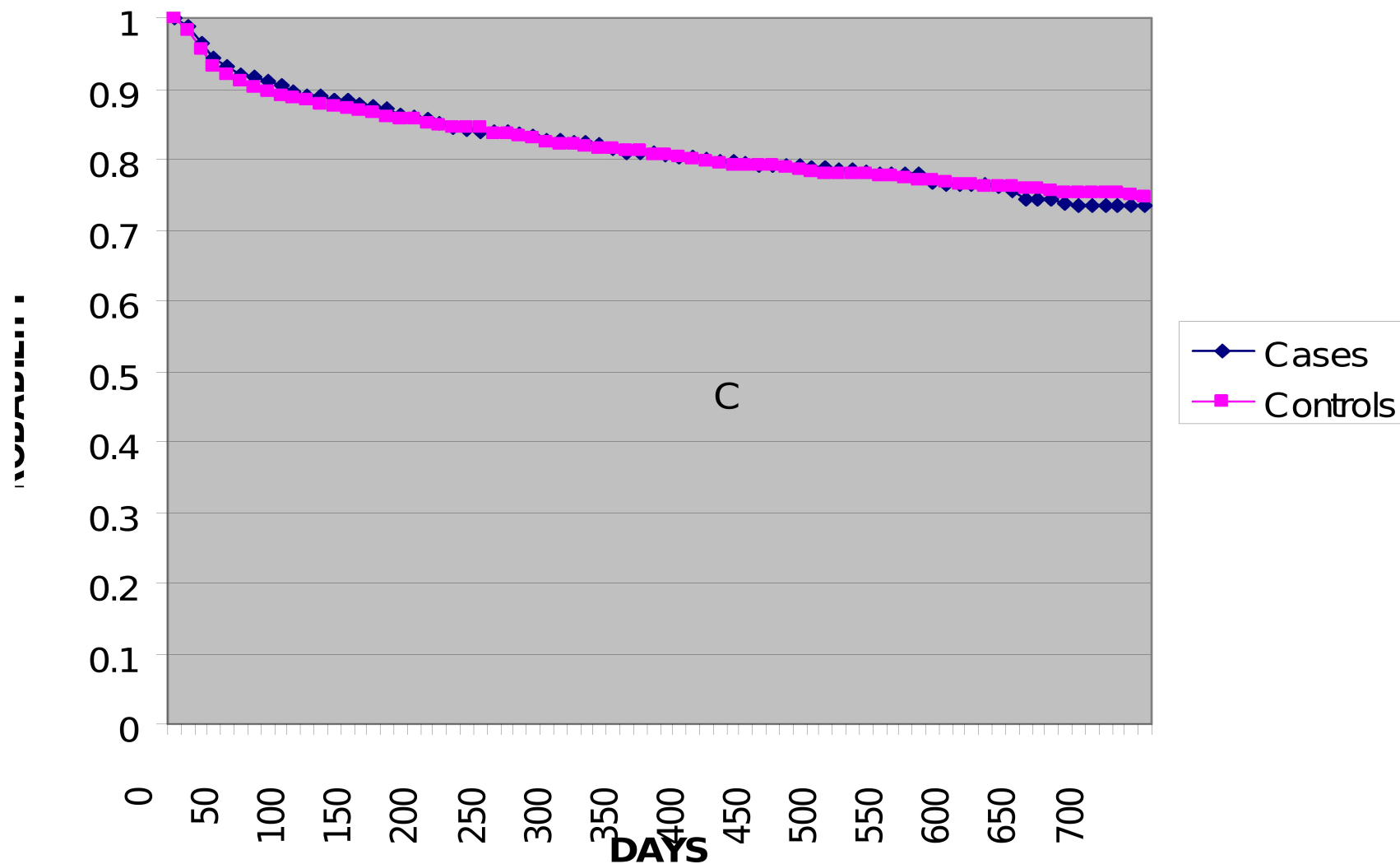
Comparing Waived and Matched Fully Qualified Comparison Active Duty Enlisted Accessions

Year of Report	Medical Condition	Number of Subjects	Effect on Attrition (DoD)
1998	Knee	281	None
1999	Back	248	High (Army)
	Skin	334	High
2000	Asthma	1,510	Low
	ADHD	508	None
	Depression	502	High
	Any/All Waivers	25,716	High
2002	Hearing Loss	2,935	High
2003	Hypertension	1,039	None
	Pes Planus	1,499	High
	Scoliosis	271	High
	Headache	696	None
2004	Myopia	1,589	None

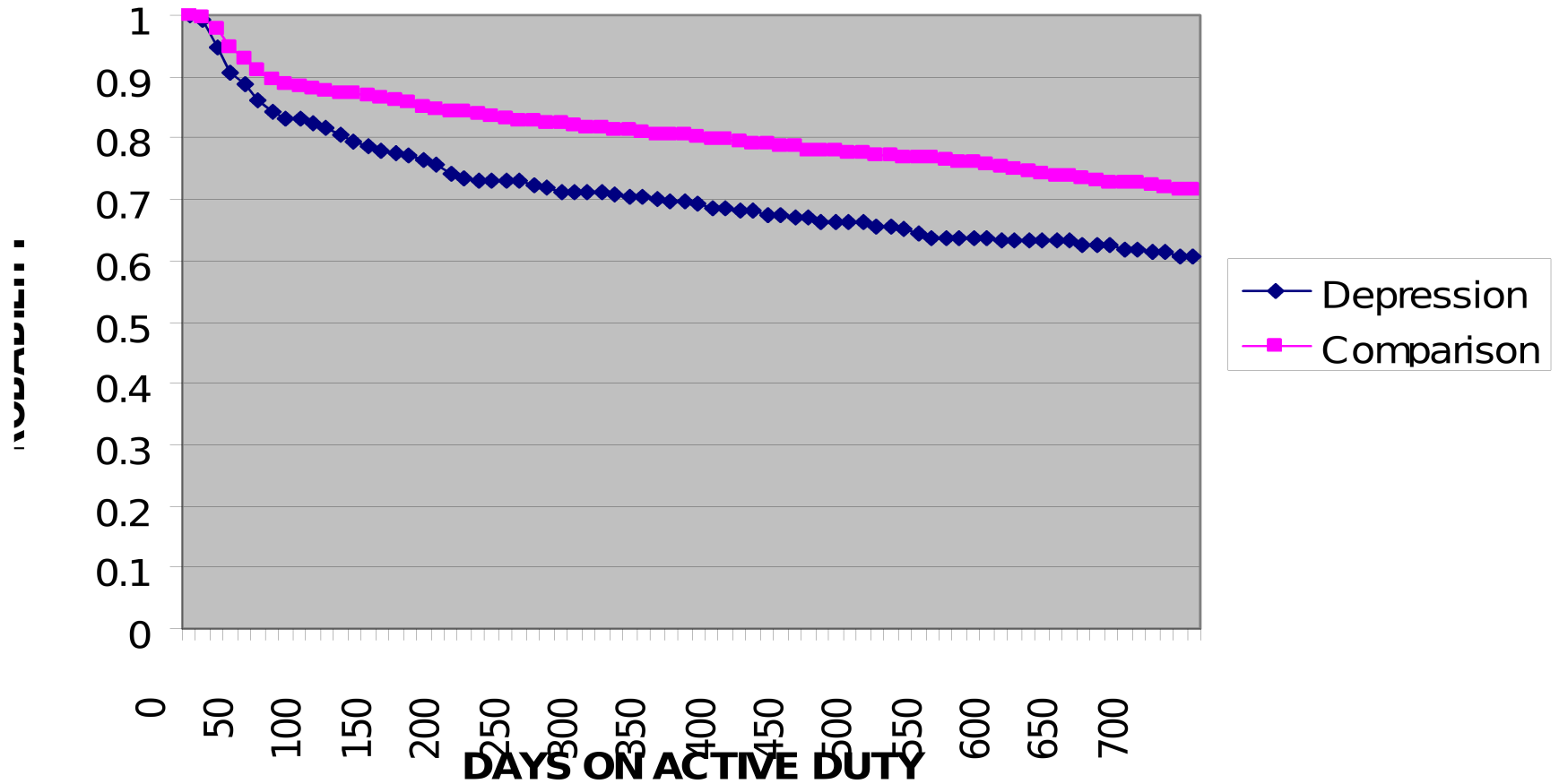
**PROBABILITY OF REMAINING ON ACTIVE DUTY AMONG ENLISTEES
GRANTED WAIVER FOR ASTHMA VS MATCHED COMPARISON SUBJECTS:
ALL SERVICES**



**PROBABILITY OF REMAINING ON ACTIVE DUTY AMONG ENLISTEES
GRANTED A WAIVER FOR ADHD SUBJECTS AND THEIR MATCHED
COMPARISON SUBJECTS: ALL SERVICES**



**PROBABILITY OF REMAINING ON ACTIVE DUTY AMONG ENLISTEES
GRANTED A WAIVER FOR DEPRESSION AND RELATED DISORDERS
VERSUS MATCHED COMPARISON SUBJECTS: ALL SERVICES**



Hospitalization rates among enlistees with a waiver for pes planus versus matched comparison subjects

		Hospitalization rates (per 1,000 p-y)	
Subject group	Person- years at risk	Lower extremity conditions	All causes
Pes planus waiver	1280	3.1	62.5
Matched comparison	3960	3.0	57.8